



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/491,302	01/25/2000	John D. Geissinger	55271USA6A	8370

7590 11/20/2002

3M Innovative Properties Company  
Office of Intellectual Property Counsel  
P. O. Box 33427  
St. Paul, MN 55133-3427

EXAMINER

BROCK II, PAUL E

ART UNIT PAPER NUMBER

2815

DATE MAILED: 11/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/491,302

Applicant(s)

GEISSINGER ET AL.

Examiner

Paul E Brock II

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 5-7 and 20-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 8-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 5 – 7 and 20 – 26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group and species, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 9.

### *Oath/Declaration*

2. The Affidavit filed on September 19, 2002 under 37 CFR 1.131 has been considered but is ineffective to overcome the Fujisawa reference.
3. The evidence submitted is insufficient to establish a conception of the invention prior to the effective date of the Fujisawa reference. While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by a complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See *Mergenthaler v. Scudder*, 1897 C.D. 724, 81 O.G. 1417 (D.C. Cir. 1897). The evidence does not show the whole invention as claimed for at least the reason that an interconnect member connected between each of the conductive layers of the capacitor is not shown.

### ***Drawings***

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the a dielectric substrate mounted on the first side of the conductive trace layer made of a non-conductive polymer blended with high dielectric constant particles must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The claim terminology “a dielectric substrate mounted on the first dies of the conductive trace layer made of a non-conductive polymer blended with high dielectric constant particles” can not be found in the originally filed specification .

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1 – 4 and 8 – 19 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It is not clear where in the originally filed specification support for “a dielectric substrate mounted on the first side of the conductive trace layer made of a non-conductive polymer blended with high dielectric constant particles” can be found.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1 – 3, 8 – 10, 12 and 14 – 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kabumoto et al. (USPAT 5883428, Kabumoto) in view of DiStefano et al. (USPAT 5455390, DiStefano) and Parker et al. (USPAT 5633785, Parker).

Kabumoto discloses in figure 1 an electronic package (4). Kabumoto discloses in figure 1 a conductive trace layer (5) having a first side and a second side, the conductive trace layer being patterned to define a plurality of interconnect pads (5a and 5b). Kabumoto discloses in figure 1 a dielectric substrate (1) mounted on the first side of the conductive trace layer.

Art Unit: 2815

Kabumoto does not disclose that the dielectric substrate is made of a non-conductive polymer. DiStefano teaches in figure 7, column 7, lines 23 – 42 and column 10, lines 62 – 67 a dielectric substrate mounted on a first side of a conductive trace layer (90) made of a non-conductive polymer. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the non-conductive polymer of DiStefano as the dielectric substrate of Kabumoto in order to use a material of a low water absorbing capacity so as to protect the package. Kabumoto discloses in figure 1 a capacitor including a first conductive layer (10), a second conductive layer (11) and a layer of dielectric material disposed between the first and the second conductive layers, the first conductive layer mounted adjacent to the second side of the conductive trace layer. Kabumoto discloses in figure 1 a plurality of interconnect regions (12a – 12d) extending through the first conductive layer and the dielectric material layer of the capacitor. Kabumoto discloses in figure 1 an interconnect member connected between each of the conductive layers of the capacitor and a corresponding set of the interconnect pads, the first conductive layer of the capacitor being electrically connected (12a) to a first set of the interconnect pads and the second conductive layer on the capacitor being electrically connected (12b) to a second set of the interconnect pads, the interconnect members corresponding to the second set of interconnect pads extending through one of the interconnect regions. Kabumoto and DiStefano do not disclose that the capacitor has a capacitance of from about 1 nf/sq.cm. to about 100 nf/sq.cm. Parker teaches in figure 4, column 5, lines 43 – 50 and column 7, lines 4 – 12 a capacitor with a capacitance of about 5 nf/sq.cm. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the capacitance of Parker in the package of Kabumoto and DiStefano in order to provide uniform power distribution and

Art Unit: 2815

capacitive decoupling in the package, resulting in lower switching noise and high operating frequencies as taught by Parker in column 5, lines 43 – 50. As far as the examiner can ascertain Kabumoto, DiStefano and Parker read on a dielectric substrate mounted on the first side of the conductive trace layer made of a non-conductive polymer blended with high dielectric constant particles.

With regard to claim 2, Kabumoto discloses in column 5, lines 23 – 34 wherein the first electrode is maintained at a first reference voltage and wherein the second electrode is maintained at a second reference voltage different from the first reference voltage.

With regard to claim 3, Kabumoto discloses in figure 1 an electrically conductive stiffening member (H) mounted adjacent to the second conductive layer of the capacitor.

With regard to claims 8 – 10, Parker discloses in column 7, lines 8 – 12 a capacitor that has a capacitance of from about 5 nF/sq.cm. to about 30 nF/sq.cm. or of at least 30 nF/sq.cm.

With regard to claim 12, Kabumoto discloses in column 6, lines 43 – 47 wherein the dielectric material of the capacitor includes a metal oxide.

With regard to claim 14, DiStefano teaches in figures 6 and 7, column 7, lines 23 – 42, and column 10, lines 62 – 67 wherein the dielectric substrate includes a plurality of apertures.

With regard to claims 15 and 16, DiStefano teaches in figure 7, column 7, lines 23 – 42 and column 10, lines 62 – 67 wherein the dielectric substrate includes a polymeric film that is a polyimide film.

With regard to claim 17, Kabumoto discloses in figure 1 wherein the interconnect member is a solder plug.

---

With regard to claim 18, Kabumoto and Parker do not disclose wherein each interconnect pad is a solder plug. DiStefano teaches in figure 7, column 12, lines 11 – 17 interconnect pad (32) is a solder ball pad. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the solder ball pad of DiStefano as the interconnect pad in the device of Kabumoto and Parker in order to use flip chip bonding for the connection.

With regard to claim 19, DiStefano teaches in figures 6 and 7, column 7, lines 23 – 42, and column 10, lines 62 – 67 wherein the dielectric substrate has an aperture extending threerethrough adjacent each solder ball pad.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kabumoto, DiStefano and Parker as applied to claims 1 and 3 above, and further in view of Dehaine et al. (USPAT 4982311, Dehaine).

Kabumoto discloses in figure 1 a device receiving region extending through the dielectric substrate and the conductive trace layer and further comprises an electronic component (3) mounted in the device receiving region. Kabumoto, DiStefano and Parker do not disclose the device-receiving region also extends through the capacitor and further comprises the electronic device mounted on the stiffening member. Dehaine discloses in figure 1 a device receiving region extending through a dielectric substrate, a conductive trace layer, a capacitor (18a and 18b) and further comprises an electronic component (12) mounted in the device receiving region on a stiffening member (20). It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the receiving region of Dehaine in the device of Kabumoto,



DiStefano and Parker in order to allow easy refrigeration of the electronic device as stated by Dehaine in column 2, lines 33 – 40.

11. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kabumoto, DiStefano and Parker as applied to claim 1 above, and further in view of Brandt et al. (USPAT 6068782, Brandt).

With regard to claim 11, Kabumoto, DiStefano and Parker do not disclose a dielectric thickness of from about 5um to about 30 um. Brandt teaches in column 4, lines 35 – 37 a thickness of a dielectric material of a capacitor within the claimed range. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the thickness of Brandt in the device of Kabumoto, DiStefano and Parker in order to have a useful thickness for a dielectric layer of a capacitor in a semiconductor package as stated by Brandt in column 4, lines 35 – 37.

With regard to claim 13, Kabumoto, DiStefano and Parker do not disclose a dielectric material made of a non-conductive polymer with high dielectric particles. Brandt discloses in column 4, lines 18 – 41 a dielectric material made of a non-conductive polymer with high dielectric particles of lead zirconium titanate. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the dielectric material of Brandt in the method of Kabumoto, DiStefano and Parker in order to form an efficient embedded capacitor that can be incorporated into layers of a PCB in order to more efficiently and effectively utilize available space.

***Response to Arguments***

12. Applicant's arguments filed September 19, 2002 have been fully considered but they are not persuasive.

13. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

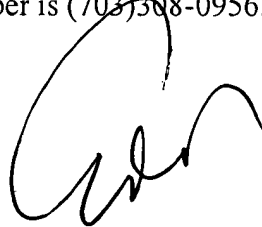

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul E Brock II whose telephone number is (703)308-6236. The examiner can normally be reached on 8:30 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703)308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Paul E Brock II  
November 13, 2002



EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2300